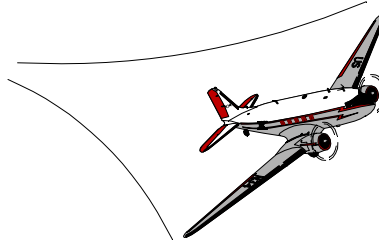


SPECIAL AIRWORTHINESS INFORMATION BULLETIN

REGULATORY SUPPORT DIVISION
P.O. BOX 26460
OKLAHOMA CITY, OKLAHOMA 73125-0460



U.S. Department
of Transportation
**Federal Aviation
Administration**

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This is issued for informational purposes only and any recommendation for corrective action is not mandatory.

INTRODUCTION

The purpose of this Special Airworthiness Information Bulletin (SAIB) is to provide **high priority** safety information regarding possible cracks and corrosion in the outboard to center wing attachment fittings of the PZL Mielec Model M-18, M18A and M-18B aircraft.

BACKGROUND

During the past 12 months two Model M-18A aircraft suffered a wing separation while conducting agricultural aerial application operation. In both cases, upon initiating a pull-up at the beginning of the turn maneuver the right wing separated due to failure of the center wing to outboard wing main spar attachment fittings. The first wing separation resulted from failure of the wing attachment fitting part #D21.200.49.0 on the center wing and the second wing separation resulted from failure of fitting part #D22.200.36.1 on the outboard wing. National Transportation Safety Board (NTSB) examination of the failed wing attachment fitting noted a line of severe corrosion on the bore of the fittings. The line of corrosion pitting was located on the bore along the slot of the Expansion Mandrel, part #D21.535.00.0. The pitting developed a high stress concentration, forming a crack running radially from the bore of the fitting, which ultimately lead to failure of the fitting. In addition, examination of the same fitting on the left wing, which had not failed, revealed the same severe corrosion and pitting in the same location, with an existing fatigue crack which had propagated about 75% through the fitting. During a recent inspection of a third aircraft, the same corrosion and a crack was noted on the wing attachment fitting.

On all three aircraft, it was noted that the Expansion Mandrel, part #D21.535.00.0, had been installed with the slot oriented downward which is in accordance with existing PZL installation instructions. NTSB examination of the expansion mandrel and bolt from the first aircraft revealed corrosion damage, secondary rotational scoring, fretting, and galling on the exterior surface. Evidence indicates the mandrel had been rotating likely allowing movement resulting in elongation of the bore of the attachment fittings. No rotation of the expansion mandrel was noted on the second or third aircraft.

The first aircraft was a 1994 Model M-18A with about 4700 hours total time. The second aircraft was a 1988 Model M-18A with about 5000 hours total time. The third aircraft was an M-18A with about 5000 hours total time. All aircraft had complied with PZL service bulletins K/02.142/91 and E/02.152/94. During compliance with these service bulletins, the wings were removed and the fittings examined using a dye penetrant inspection. The inspection revealed no cracks in the fittings. The wings were reinstalled and treated with corrosion preventative per PZL service information. The first aircraft wing separation occurred after 530 hour time in service and 3.5 months after the wing was inspected. The second wing separation occurred after about 1000 hours time in service and nine months after the wing was inspected. It is unknown at this time if the cracks that lead to wing separations existed at the time of the inspection and could not be detected or if the crack originated after the inspection. The crack in the third aircraft was discovered during an inspection of these fittings upon knowledge of the first two aircraft.

DISCUSSION

Inspection for cracks with a 5-power magnifying glass or dye penetrant method as identified in the PZL service information may not identify the cracks. Use the magnetic particle inspection method to inspect the attachment fittings especially along the bore next to the slot of the expansion mandrel. If a crack is found the fitting should be replaced. If corrosion is found, the corrosion should be removed or the fitting replaced. These fittings are treated with a 12 micron thick cadmium plating. PZL does not have corrosion removal procedures in the maintenance and repair manuals. PZL is planning to offer assistance and plans to prepare applicable repair documentation.

Special attention should be given to the torque of the bolt in the expansion mandrel prior to wing removal and to any rotation of the expansion mandrel. Insufficient torque could allow for movement of the attachment fittings about the bolt and mandrel, possibly leading to elongation of the bore of the fittings. If elongation of the bore has occurred, this condition should be corrected per the PZL maintenance and repair information. Excessive torque causes excessive loads on the fittings which could result in premature fitting failure.

RECOMMENDATION

The FAA and the NTSB have communicated with PZL about the wing separations and how to prevent future separations. PZL recommends that upon reaching 3000 hours time in service, remove the outboard wing from the inboard wing and inspect the attachment fittings for corrosion and cracks. Inspect for cracks using a magnetic particle inspection technique or equivalent. Repeat this inspection at each 500 hour interval or annually thereafter. If corrosion is found contact PZL for corrosion removal information or replace the fitting. If the fitting is cracked **the FAA highly recommends replacing it.**

The FAA is considering an Airworthiness Directive (AD) requiring this recommendation. Credit could be given to those who have inspected these fittings in accordance with the applicable AD if issued.

All serial numbers of the M-18, M-18A and M-18B have a maximum airframe service life of 6000 hours. For the M-18 and M-18A to serial number 1Z022.26 Service bulletins K/02.142/91 and E/02.152/94 should be complied with to extend the service life up to 6000 hours. For the M-18A and M-18B starting at serial number 1Z022.27 and subsequent, mandatory instructions to obtain the 6000 hour airframe service life are included in the Airplane Description and Service Manual, Sections 8, "Airworthiness Limitation". Also, note the service life calculation of the airframe for overload operation (takeoff weight above 10,340 pounds) explained in "Airframe Service Life in Overload Version" in the M-18 repair manual. Flight time at a weight above 10,340 pounds shall be multiplied by a factor 1.35.

FOR FURTHER INFORMATION CONTACT

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